



REVIEW REPORT

on the

**MARINE I/O & OUTDOOR POWER
EQUIPMENT TECHNICIAN
PROGRAM**

OCTOBER, 2002

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EXECUTIVE SUMMARY

This is the second review of the Marine I/O & Outdoor Power Equipment Program, the first having taken place in December 1992. The 2002 Review Committee assessed program as a successful operation that is well received by students and industry. The instructor is highly regarded for his teaching skills and the program has high job placement (92% of its graduates in the labour market are working). Nonetheless, this is a time of challenge and change for the program.

Currently, with the demise of the Industrial Training and Apprenticeship Commission and the relinquishment of post-secondary training coordination to a transition committee, flux and turmoil characterize the industrial trades post-secondary education sector. The New Era thinking is to shorten existing trade entry programs from 10 months to five or six. Such thinking coincides with the proposal of this Review Committee to separate the current program into two five to six month programs, one of which would concentrate on marine small engine technician training, and the other on power sports equipment, such as ATVs, golf carts, skidoos, etc. A core curriculum—the prerequisite to both programs—is already in place, and the separating of the existing curriculum into two strands would not be onerous. Funding for an additional faculty member to teach the second stream would have to be found.

This is the major recommendation of this Review Committee. Other recommendations address the need for increased emphasis on communication and computer skills, for a revised budgetary process that accurately projects expenditures by program, for new strategies to secure donations of teaching aids from industry, for a drop curtain in the shop area, and for re-orientation of the Program Advisory Committee.

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MARINE I/O & POWER EQUIPMENT PROGRAM REVIEW
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CHRONOLOGY OF THE MARINE INBOARD/OUTBOARD & OUTDOOR POWER EQUIPMENT TECHNICIAN PROGRAM REVIEW

The Marine I/O & Outdoor Power Equipment Technician Program Review was launched on March 20, 2002. A planning meeting between Marine I/O faculty member, Matt Skelly, and Institutional Research and Planning members was held to discuss program review procedures and questionnaire design. Guidelines and examples of required documents for the program review were provided. Questionnaires were refined and finalized by April 27, 2002.

Stakeholders in the Marine I/O & Outdoor Power Equipment Program were surveyed on the following dates:

Current Students	April 30, 2002
Former Students (1997-01):	May 3, 2002
Advisory Committee Members:	May 3, 2002
Employers:	May 3, 2002
Faculty:	May 9, 2002

Reminders were mailed to non-responding former students, employers and Advisory Committee members on May 24, 2002. Both faculty members responded by May 24, 2002. The Office of Institutional Research attempted to contact non-responding former students, Advisory Committee members and employers by phone between June 10th and 17th.

Former student data from 1997-2001 were summarized from Student Outcomes Reporting System (SORS) data, as provided by the Centre for Education Information, Standards and Services (CEISS).

The cut-off date for all responses was July 16. Information binders were sent to members of the Marine I/O Program Review Committee on July 23, and that committee met to analyze the data and form its recommendations on September 6, 2002.

PROGRAM BACKGROUND

The Marine I/O & Outdoor Power Equipment Program has been offered at UCC in its present form since September 1987. Its predecessor was the Small Engine Repair Program, which was offered at UCC from 1973 to 1987, apart from a hiatus during the early 80's when the program was closed for budgetary reasons.

The purpose of the current program is to prepare workers to function as apprentices in the Inboard/Outboard Marine Engines & Outdoor Power Equipment trades. Special emphasis was placed on tune-up and troubleshooting, plus the maintenance and installation of accessories used on pleasure craft and snowmobiles. It also includes servicing of the "Engine Support Systems" such as fuel, electrical, lube, and cooling, plus power trains and drives, related to these products.

With the retirement of Leno Zanier in 1998, Matt Skelly has taken over as the main instructor of the Marine I/O & Outdoor Power Equipment Technician Program.

MARINE I/O & OUTDOOR POWER EQUIPMENT PROGRAM CAPACITY, DEMAND & COMPLETION RATES

(Source: UCC Colleague)

Note: Graduation figures are taken from Colleague with a cast date between May 1st and June 30th.

1997 Applications	20	Accepted	13	Enrolled	11	Graduated 1998	11
							Graduation Rate 100%

1998 Applications	17	Accepted	17	Enrolled	16	Graduated 1999	14
							Graduation Rate 88%

1999 Applications	44	Accepted	16	Enrolled	16	Graduated 2000	13
							Graduation Rate 81%

2000 Applications	33	Accepted	25	Enrolled	15	Graduated 2001	15
							Graduation Rate 100%

2001 Applications	52	Accepted	22	Enrolled	16	Graduated 2002	11
							Graduation Rate 69%

2002 Applications	32	Accepted	15	Enrolled	N/A	Graduated 2003	N/A
							Graduation Rate N/A

TABULAR SUMMARY OF QUESTIONNAIRE RESPONSES
MARINE I/O & OUDOOR POWER EQUIPMENT PROGRAM REVIEW

Recipient	# Sent	# Completed & Returned	% Returned
Faculty:	2	2	100%
Employers:	16	9	56%
Advisory Committee Members:	9	6	67%
Former Students:	61	27	54% (*net)
Current Students:	12	12	100%
SORS – MARI (BC College and Institutes Student Outcomes Data: 1997-2001)	68	42	62%
TOTAL	168	98	62%*

*(Note: The number of returned envelopes is subtracted from the number sent to attain the % returned.)

Returned Envelopes:
Former Students = 11

Total Non Respondents = 44
 (excluding SORS)

SUMMARY OF QUESTIONNAIRE RESPONSES

The Review Committee used the following criteria in analyzing the questionnaire responses: On a scale of 5 points, ratings of 4.0 or above were considered to be excellent; ratings of 3.50-3.99 were considered to be satisfactory to good; ratings of 3.00-3.49 were considered less than satisfactory; and ratings below 3.00 were considered to be cause for concern. Subjective comments were considered if two or more respondents expressed the same view. It was also recognized that a small number of respondents means that individual variances can have a large impact when averaging.

FORMER STUDENTS:

Twenty-seven students responded to the questionnaire.

The demographics of this group are quite striking – 24 (89 per cent) of respondents were men while only three (11 per cent) were women. Almost half (48 per cent) were aged 40 and older. Twenty-three respondents (85 per cent) were employed.

Former students responded very positively (4.00 and higher) to questions about general program effectiveness, program content and procedures and the quality of instruction.

Questions about program content in the areas of written communication skills, résumé writing, grooming and access to computers generated responses that were in the satisfactory to good range.

Some of the respondents indicated a need for more up-to-date equipment for instructional purposes.

There were 16 comments suggesting that the current program be split into two separate programs, one focusing on marine engines and the other on outdoor power engines.

CURRENT STUDENTS:

Twelve students in the May 2002 graduating class responded to the questionnaire.

The demographics of this group mirrored that of the former students – 11 (92 per cent) were male and 1 (8 per cent) was female. Five (42 per cent) were aged 40 and up.

Current students also responded very positively to questions about general program effectiveness, program content and quality of instruction. The rating for résumé writing skills instruction was also high (4.00) but the ratings were slightly lower for written communication skills (3.50), grooming (3.42), the quality of computers used in the program and opportunities to evaluate the program and instruction (both 3.67).

Some of the current students also indicated a need for more up-to-date equipment for instruction and four suggested that the program be split into two separate programs, with one focusing on marine engines and the other on outdoor power engines.

FACULTY:

Both faculty members completed questionnaires.

Again, responses were very positive (4.00 and up) to questions about program objectives, general program effectiveness and the quality of instruction.

Responses were positive, but less so, to questions about program effectiveness in developing oral and written communication skills, grooming and, in particular, résumé writing skills.

Concerns were expressed about the need for more up-to-date equipment for instructional purposes and the sufficiency of funds for faculty to maintain currency with the field.

Questions about the frequency and productivity of divisional meetings generated negative responses (1.50 to 2.50).

Both respondents suggested the program be split into two stand-alone programs, with one focusing on marine engines and the other on outdoor power engines.

EMPLOYERS:

Nine respondents sent in replies to the questionnaires.

Responses to questions about student competencies and general program effectiveness generally indicated that program graduates met or exceeded employer expectations.

A majority of the employers responding to the questionnaire believe the industry will require more graduates during the next five years.

Although none of the employer respondents suggested splitting the current program in two, there was a suggestion that a stand-alone marine program be established.

ADVISORY COMMITTEE:

Six advisory committee members responded to the questionnaire.

Advisory committee members generally responded positively to questions about the quality of instruction and provided neutral-to-positive responses to questions about general program effectiveness and facilities.

There were some negative responses to questions about the sufficiency of training in oral and written communication skills and résumé writing and also to questions about the provision of skills and knowledge that match current industry needs.

There was a suggestion that the program put more emphasis on "power sports" equipment such as motorcycles, ATVs and snowmobiles instead of lawn care equipment.

Respondents indicated that employer demand for program graduates is expected to increase.

Answers indicated concern among some advisory committee members about the committee's role and frequency of meetings. Similar concerns were expressed in later interviews with advisory committee members.

STRENGTHS OF THE MARINE I/O & OUTDOOR POWER EQUIPMENT TECHNICIAN PROGRAM

The Review Committee has identified the following strengths in the Marine I/O & Power Equipment Program:

1. Employment Outcomes

Former students report a high employment rate, with 67 per cent employed full time, 7 per cent employed part time and 11 per cent self employed. Disregarding respondents who are not actively seeking work, the program boasts a placement rate of 92 per cent. Graduates are in demand and responses from both employers and advisory committee members indicate that demand for program graduates is expected to continue to be strong – indeed, faculty report that industry demand for graduates exceeds the supply. Employers also report that the graduates they have hired meet or exceed expectations.

2. Quality of Instruction

Respondents from all categories – and particularly former and current students – rate the quality of program instruction very highly. It is clear that the current instructor and past instructors have done an excellent job in establishing expectations, keeping curriculum up to date, providing clear explanations of assignments, grading fairly and consistently and structuring the delivery of course material in a pedagogically sound manner. Students also reported that their instructor provided fair and timely feedback and was readily available for consultation.

3. General Program Effectiveness

Respondents from all categories indicate that the program is successful in giving students a good balance of practical and theoretical knowledge and establishes sound work skills in areas such as safety, problem-solving and general workplace procedures.

4. Facility

Although some concerns were expressed about the currency of equipment for teaching, shop and classroom facilities were rated highly for their success in simulating a realistic workplace environment.

AREAS OF MARINE I/O & OUTDOOR POWER EQUIPMENT PROGRAM THAT CAN BE IMPROVED (with recommendations)

1. PROGRAM RESTRUCTURING

Perhaps the most persistent thread throughout all the surveys was the suggestion that the current program is serving the needs of neither its marine engine nor its power equipment cohorts as well as it could, and that the creation of two separate programs--a Marine I/O stream and a Power Sports Equipment stream--would better serve these two constituencies. Sixteen former students, four current students and both faculty members made this suggestion, while various employers and advisory committee members advocated that more emphasis be put on either the marine engine or the power equipment components of the program. The Review Committee is persuaded that separating the current program into two five-six month programs each with a common core prerequisite and staggered intakes makes sense, for the following reasons:

- The Industrial Training and Apprenticeship Commission Transitional Committee appears to be leaning towards shortening all entry level programs to six months or less;
- There is already precedent for such program restructuring at UCC, with the Electrical Trade Entry Program planning to move to a similar six-month format (see **Electrical Trade Entry and Electrical Apprenticeship Programs Review, June 2002**);
- The common core element of the curriculum is already in place, thanks to the old TRAC curriculum of the 1980s, so very little curriculum development effort would be required here;
- Because there is no set provincial curriculum for entry level programs (as there is for apprenticeship), the instructor can arrange the entry level curricula as he sees fit;
- Moving from one 10-month program with an intake of 16 students to two five/six-month programs with an intake of 16 each potentially improves utilization and productivity (however, it will also require the hiring of a second instructor);

The Marine I/O program would encompass and expand the existing marine curriculum, while the Power Sports Equipment stream would cover all the non-marine types of activities such as chain saws, ATV's, golf carts, lawn and garden equipment, etc. Note that the Review Committee endorses the proposal to change the name of this stream from "Outdoor Power Equipment Technician" to "Power Sports Equipment Technician".

In order to facilitate the two separate streams, the Common Core Materials could be delivered in an on-line environment or as a separate course, which would be a prerequisite for the program. This would pre-qualify the students and potentially reduce the program to five or six months for each stream. The Review Committee recommends:

Recommendation 1 (a):

That the Marine I/O & Power Equipment instructor, the Chairperson, Mechanical Trades, the Program Development Administrator, and the Dean, Trades and Technology develop the curricula and plan the logistics for separating the Marine I/O and Power Equipment Program into two streams, as outlined above—a Marine stream and a Power Sports Equipment stream—with a possible implementation date of Fall 2004.

ACTION: Marine I/O & Power Equipment Instructor; Chairperson, Mechanical Trades; Program Development Administrator; Dean, Trades and Technology

2. CURRICULUM

Apart from the comments on the hybrid nature of the program and the need for resolution of that issue (see above), the curriculum and its delivery received generally high ratings. Several areas where the ratings were satisfactory but lower than for other areas were those of written communications, résumé writing skills, grooming and computing skills. The Review Committee feels that, with the increased demand from industry for better communication and interactive skills, greater emphasis might be placed on these

skills in the curriculum, and suggests:

Recommendation 2 (a):

That the Marine I/O & Outdoor Power Equipment Instructor explore the possibility of including an English communications course in the program, along the lines of ENG 149, taught to Electronics students, or ENGL 130/131, taught to Horticulture students. The possibility of offering a general Communications course throughout the entire Trades and Technology Division should also be explored.

ACTION: Marine I/O & Outdoor Power Equipment Instructor; Chairperson, Mechanical Trades; Dean, Trades and Technology

Recommendation 2 (b):

That the implementation of an on-line work order system be explored. This system can also be used for the other mechanical programs, and would address in part the need for more writing practice.

ACTION: Marine I/O & Outdoor Power Equipment Instructor; Chairperson, Mechanical Trades; Dean, Trades and Technology

Recommendation 2 (c):

That the Marine I/O & Outdoor Power Equipment Instructor increase the amount of on-line practice time afforded to the program's students. While parts look-up is still done on microfiche in most shops, the industry will have moved to computerized parts catalogues within 10 years, and such training will give UCC graduates a head start in the industry.

ACTION: Marine I/O & Outdoor Power Equipment Instructor

3. FACILITIES

While the shop facility received plaudits from most quarters, Marine I/O and Power Equipment students, former students and faculty drew attention to excessive noise as the one of the drawbacks of the common shop area shared with Automotive Technician students. The Committee recommends:

Recommendation 3 (a):

That the Marine I/O & Power Equipment Instructor and the Chairperson, Mechanical Trades, investigate the possibility of installing a drop curtain between the two program areas, cost it, and recommend purchase to the Dean, Trades and Technology.

ACTION: Marine I/O & Power Equipment instructor; Chairperson, Mechanical Trades

4. CAPITAL and SUPPLIES BUDGETS

Reviewing the program budget for the last four years, the Committee noted overruns of 31%, 25%, 68% and 70% on the instructional supplies budget line, and overruns of 187% and 362% during 2000 and 2002 respectively on the equipment repair line. The Committee's inference was that the budget projections have failed to reflect the true costs of instructional supplies and equipment maintenance in the program and should be revised in line with actual operating costs. It was pointed out by the Chairperson, Mechanical Trades, however, that not all costs incurred are attributable to the Marine I/O and Outdoor Power Equipment Program alone; other programs are charging supplies and equipment maintenance to this account.

Whatever the explanation, this program—and the Trades and Technology Division as a whole—should address the fact that its budgeting processes are inaccurate and its accounting mechanisms inadequate to track and attribute its expenditures. The Trades and Technology Division should develop a transparent budget process so that programs such as this one can reasonably expect that the funds allocated for supplies and equipment maintenance will cover their operating costs. The division also should ensure that

expenditures are attributed to whatever program is spending the money, and not to some departmental or divisional pot where individual program accountability is impossible to establish, so as to facilitate the tracking and monitoring of expenditures. The Committee accordingly recommends:

Recommendation 4 (a):

That the Dean, Trades and Technology, create a transparent budgeting formula which calculates vocational program supplies and equipment maintenance budgets on the basis of actual operating costs, number of sections (or number of instructional days per year), and level and complexity of instruction. (See also Recommendation 5 (c), Electrical Trade Entry and Electrical Apprenticeship Programs Review, June 2002).

ACTION: Dean, Trades and Technology

Due to the cancellation of the provincial Matching Funds Program and the challenges of corporate contact facing the UCC Equipment Campaign, the Marine I/O & Outdoor Power Equipment Program and other programs in Mechanical Trades acknowledge that it is becoming more difficult to secure equipment donations for use as training aids. The Review Committee recommends that, with the imminent reorganization of the Trades and Technology Division and its downsizing to three departments (Mechanical, Construction and Manufacturing), a case should be made for increased release time for the chairpersons so they can devote more time to canvassing and soliciting corporations and industry for equipment donations. The Committee recommends:

Recommendation 4 (b):

That Dean, Trades and Technology, attempt to secure increased release time for the chairs of Mechanical Trades, Construction Trades and Manufacturing so that they can intensify their efforts to obtain equipment donations for teaching aids from corporations and industry.

ACTION: Dean, Trades and Technology

5. ADVISORY COMMITTEE

The Advisory Committee survey responses showed some confusion about the committee's scope, function and effectiveness. This committee could use some assistance in setting its goals and objectives. For example, this group could be encouraged to assist the program instructor and the departmental chair in soliciting equipment donations from suppliers/retailers for the program. We recommend that

Recommendation 5 (a):

At its next meeting, the Marine I/O instructor and the Chairperson, Mechanical Trades, explain to the Marine I/O and Outdoor Power Equipment Program Advisory Committee that its mandate should extend beyond curriculum validation to marketing the program, acting as liaison with corporations and industry, and actively soliciting donations to the program. (See UCC Regulation R-2013, Terms of Reference, 2d. and 2 f.)

ACTION: Marine I/O & Outdoor Power Equipment Instructor; Chairperson, Mechanical Trades

APPENDIX A **METHODOLOGY**

The data were collected in the following ways:

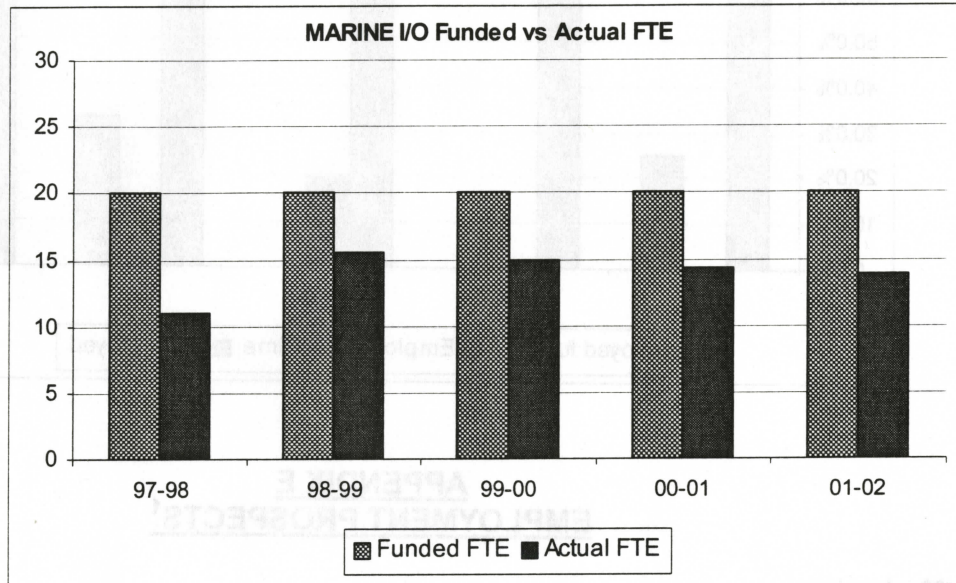
- 1) Consultation took place with Matt Skelly, Marine I/O & Outdoor Power Equipment Instructor, on the design of the surveys.
- 2) Surveys were administered to Marine I/O & Outdoor Power Equipment faculty, current students, Program Advisory Committee members, employers, and former students. All data were processed using SPSS to achieve frequency rates and mean responses. Subjective comments for each group were recorded separately and anonymously. Former student data from 1997-2001 graduates of the Marine I/O program were summarized from Student Outcomes Reporting System (SORS) data, as provided by the Centre for Education Information, Standards and Services (CEISS).
- 3) "Descriptive Data" on the Marine I/O & Outdoor Power Equipment Program's objectives, course outlines, etc., were solicited from Matt Skelly, Marine I/O instructor.
- 4) Data on enrolment figures, graduation rates, gender and grade distributions were provided by the Office of Institutional Research and Planning.
- 5) The following people associated with the program participated in the review process or were interviewed:
 - two students from the current Marine I/O & Power Equipment Program were interviewed;
 - Dave Wharf, recently chairperson of Mechanical Trades and relief instructor in the program, submitted a written deposition on the program.

APPENDIX B UTILIZATION - FUNDED VS ACTUAL FTE: 1997 - 2002

(Source: UCC Factbooks 1997/98 – 2001/02)

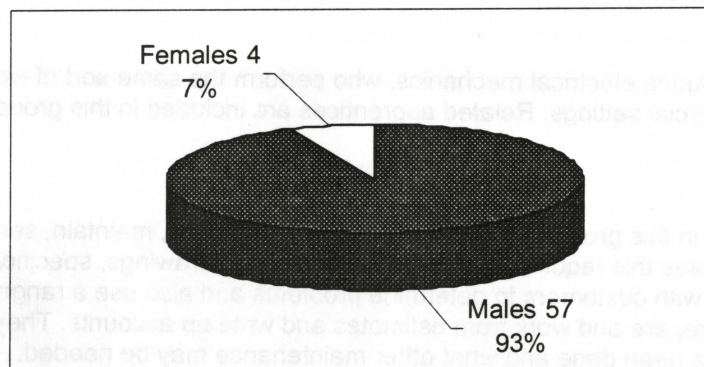
MARINE I/O/

	1997-1998	1998-1999	1999-2000	2000-2001	2001-2002
Funded FTE	20.0	20.0	20.0	20.0	20.0
Actual FTE	11.0	15.6	15.0	14.3	13.9
Utilization Rate	55%	78%	75%	71.5%	69.5%



APPENDIX C GENDER RATIO OF FORMER MARINE I/O & OUTDOOR POWER EQUIPMENT PROGRAM STUDENTS – Aug/97 to Jun/01

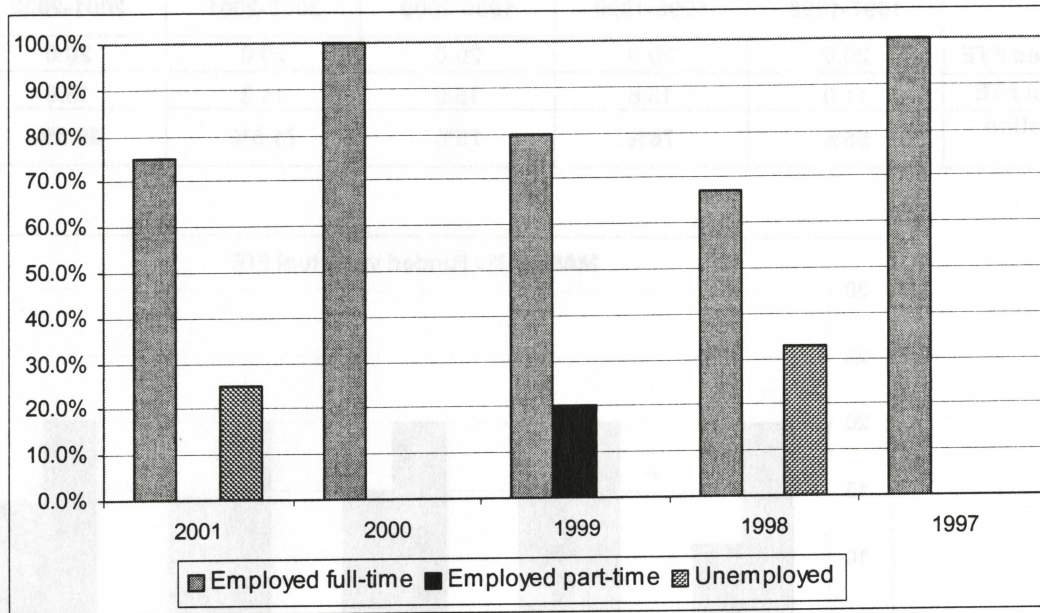
(Source: Colleague)



APPENDIX D

FORMER STUDENTS EMPLOYMENT RELATED DATA

(Source: BC College and Institutes Student Outcomes Data: 1997-2001)



APPENDIX E

EMPLOYMENT PROSPECTS¹

Other Mechanics

Nature of the Work

This occupational group includes workers who service and repair heating systems, electric appliances, electrical equipment and transformers, small engines and motorcycles.

These mechanics are employed by electrical and other repair shops, appliance service companies and repair departments of retail and wholesale establishments, motorcycle dealers and companies that install and service heating systems.

This group also includes electrical mechanics, who perform the same sort of work on larger machines, often in industrial or commercial settings. Related apprentices are included in this group.

Main Duties

Generally, workers in this group carry out a range of tasks to test, maintain, service and repair engines and motors. In many cases this requires reading and interpreting drawings, specifications and shop manuals. Mechanics consult with customers to determine problems and also use a range of diagnostic tools and equipment. They prepare and work from estimates and write up accounts. They must be able to explain to customers what has been done and what other maintenance may be needed.

Making repairs involves adjusting, repairing or replacing mechanical or electrical system parts and components using hand tools as well as soldering and brazing equipment. Mechanics also test and adjust repaired systems for proper performance. Increasingly, these repair people use electronic diagnostic equipment and work with electronic components of products.

¹ (Source: BC WORK Futures, NOC 733)

Oil and solid fuel heating mechanics service and perform scheduled maintenance on oil, wood and coal burning furnace systems. Unlike others in this group, they also carry out initial installations of heating equipment and must be able to lay out and assemble new systems, and install and connect control devices, thermostats and other oil burner components to motors and electric power outlets.

Electric appliance servicers work on major appliances, such as refrigerators and microwaves, and small appliances found in the home, such as lawn mowers and power tools. They are also required to use test equipment, such as meters and gauges, to measure resistance, current, voltage and pressure.

Motorcycle mechanics and other small engine mechanics test, repair and service motorcycles, scooters, forklifts, all-terrain vehicles, small gasoline engines in snowmobiles and lawn equipment, small marine engines and pumps. Members of this group often have job titles that identify a specialty, such as motorboat mechanic.

Electrical mechanics differ from others in this group in that they usually work on larger engines and systems. They are employed to service electric motors, transformers, switchgears, generators and other equipment used to power machinery in commercial and industrial settings. They do some machining, and they recondition or modify shafts, commutators or other parts. They also wind, assemble and install various types of coils for electric motors or transformers and balance armatures or rotors. Like others in this group, they use welding, brazing and soldering equipment as well as hand tools. Although specialization may occur, workers in this group are expected to be capable of repairing all electrical devices.

Example Titles

oil and solid fuel heating mechanic (7331):

- heating technician
- apprentice oil burner mechanic (residential)
- oil burner mechanic
- oil and solid fuel heating mechanic
- wood burner installer
- oil burner apprentice

electrical appliance servicer (7332):

- apprentice appliance service technician
- appliance service technician
- domestic refrigeration and air-conditioner servicer
- electrical appliance servicer
- refrigerator repairer
- service technician
- vacuum cleaner repairer
- washing machine servicer

electrical mechanics (7333):

- coil winder and repairer
- electric motor repairer
- industrial motor winder repairer
- transformer repairer

motorcycle and related mechanics (7334):

- apprentice motorcycle mechanic
- all-terrain vehicle repairer
- motorcycle mechanic
- snowmobile repairer

other small engine mechanics (7335):

- air-cooled engine mechanic
- apprentice inboard/outboard mechanic
- apprentice marine repair technician
- outboard motor mechanic
- apprentice outdoor power equipment technician
- small engine mechanic
- small equipment repairer
- small equipment mechanic apprentice

Education and Training

A four-year apprenticeship is usually required to work as an oil burner mechanic, air compressor and pneumatic tool mechanic, motorcycle mechanic, outdoor power equipment technician, forklift mechanic, marine engine mechanic, office machine repairer, electrical rewind mechanic or appliance service technician in B.C. In-school technical training, available at many provincial colleges, university colleges or at the British Columbia Institute of Technology (BCIT), is part of the apprenticeship program for all of these occupations, except for oil burner mechanics and office machine repairers. Completion of entry-level training programs at a post secondary institution may confer credit toward some of the required technical training in these trades. The Industry Training and Apprenticeship Commission (ITAC) recommends that individuals complete grade 12 or equivalent education, with appropriate English, mathematics and science courses, prior to entering an apprenticeship.

Individuals who complete an apprenticeship will receive a Certificate of Apprenticeship, with many of these occupations also being eligible for a Certificate of Qualification. A Certificate of Qualification is also available for people who have worked for a long time in these professions but have never completed an apprenticeship. Certificates are awarded following submission of evidence of substantial full-time experience in the trade and successful completion of an exam. It is not necessary to have a Certificate of Qualification to work in these fields, however, most employers require or recommend having it. For more detailed information on certification contact a local ITAC area office.

Provincial post secondary institutions also offer programs for those who do not necessarily wish to pursue apprenticeship training. BCIT offers a 34-week Motorcycle Mechanic Certificate program. Malaspina University College and the University College of the Cariboo offer 10-month technician programs in inboard/outboard marine and small engines. BCIT has a 34-week Inboard/Outboard Mechanic Certificate program. An 8- to 10-month Outdoor Power Equipment Certificate program is offered by Kwantlen University College, and BCIT has a 34-week Power Equipment Mechanic Certificate program. Both Camosun College and Kwantlen University College offer nine-month certificate programs in appliance repair.

Mechanics must be comfortable with computerized and electronic systems and have an ability to diagnose problems and an ability to read schematic diagrams or product manuals. They should be strong and physically fit. Due to the increasing use of electronic components in this area, workers would be well advised to develop some skills in electronics. Customer relations skills are usually necessary.

Working Conditions

Workers in this group usually work a 35 to 40 hour week during weekdays. In some cases service calls may take place during evening or weekend hours to accommodate clients who can't be at home during the day. Overtime may be required during busy times.

Some workers in this group work in repair shops and do "bench work" repairs on portable pieces of equipment. Others spend much of their time in clients' homes and probably drive a van or truck that contains an inventory of parts. Some, such as electrical mechanics, work in large industrial or commercial buildings, or travel between such sites. Outside work may be necessary, for example, in the maintenance of small pleasure boats. Noise and fumes are common, especially in shop conditions. Some employers may require repairers to wear uniforms.

In many cases, workers are required to repair a wide range of equipment, and models and brands change often. As a result, workers must be able to pick up new information quickly and adapt their existing skills to new situations. Some workers belong to workplace unions.

Workers in this occupational group have earnings that are close to the provincial average. In 1995 these workers averaged an annual income of \$28,800, compared to the all-occupation average of \$27,900. Workers who were employed full time for the full year earned on average \$34,600, slightly below the provincial average of \$39,400. However, there is significant variation among the specialties. Electrical mechanics earned the highest wages, at \$46,000 full time, full year, and motorcycle mechanics earned the lowest, at \$28,200 for full-time, full-year work.

Recent college graduates who found work in these mechanical trades reported average monthly salaries of between \$1,850 and \$2,910 per month for full-time work. For those who work for the full year, that translates into annual starting salaries of between \$22,200 and \$34,900. Again, there is significant variation among the specialties, with, for example, a few well-paid electrical mechanics earning much more than motorcycle mechanics.

In 1998 there were 3,890 people in this occupation in B.C., down from 4,140 in 1990. The biggest specialty within this category is appliance repairers, who make up about 32% of the group. The next largest pool of positions comes from the miscellaneous group of other repairers (33%), followed by electrical mechanics (29%). Heating mechanics (6%) and motorcycle and related mechanics (5%) are much smaller occupations within this group.

Self-employment within this broad category of workers is more common than the workforce average, as the work lends itself to small, independent businesses. Overall, 28% of these workers are self-employed, compared to 15% of the general workforce. Electric appliance repairers have a very high level of self-employment, at 42%, while electrical mechanics have the lowest rate of self-employment, at 7%.

The amount of part-time and part-year work in this group is a little higher than the all-occupation average. For the whole group, about 56% work full time for the full year, and 31% work full time for part of the year. Motorcycle and other related mechanics have a high level of part-year work, at around 41%.

The unemployment rate among this group as a whole is just below the provincial average. Heating mechanics have the highest unemployment rate among these mechanics.

These specialties are subject to seasonal slowdowns, and workers considering these areas might do well to cross-qualify in complementary areas. For example, a motorcycle mechanic might wish to become expert in snow blowers and snowmobiles in locations with cold winters, and heating mechanics might cross-qualify in air-conditioning and refrigeration, although this would mean completing another four- to five-year apprenticeship program.

This occupational group is employed in small numbers across a wide range of industries. The most significant sector for employment of this group is retail trade, which includes department and household furnishing stores and recreational equipment retailers. The retail trade employs 35% of those working in this occupational group. Another 11% fall into the service industry, 11% work in railway and transportation sectors, and the construction industry employs about 8% of these workers. Because workers in this group are useful for fixing and maintaining so many kinds of things, they can be employed directly by large employers in almost any industry.

Geographically, these workers are slightly less likely than average to work in the Lower Mainland (46% compared to 57% of the total workforce). Because many of their clients are private consumers, they don't need to be centred around the business and finance centre of Vancouver. They are overrepresented on Vancouver Island (24%) and in the Okanagan/Kootenay region (20%), and 10% are in Northern B.C. Once again, the specialties within this occupational group may have an impact on one specific set of workers. For instance, heating mechanics are found in exceptionally large numbers on Vancouver Island and in Northern B.C., where many people still heat with oil.

Less than 2% of these workers are women, and 21% of these women work part time, compared to 13% of the men in this group. Just over one-third of these women have full-time, full-year jobs.

The average worker in this occupational group is 42, four years above the all-occupation average of 38.

Employment Prospects

This is a medium-sized occupational group, made up of about 3,890 workers in B.C. in 1998. The Canadian Occupational Projection System (COPS) projects employment of workers in this group to grow at an annual rate of 0.4%, slower than the average for all occupations. According to this projection, only 150 openings will result from growth in the number of new jobs between 1998 and 2008. However, because of an aging B.C. workforce, particularly for workers in this group, an additional 840 positions are projected to result from the need to replace workers who retire.

The low employment growth projected for this occupational group is mainly because of advances in technology and automation, which together will continue to enable employers to do more work with fewer workers. Advances in technology also are causing heating systems, electric appliances, electrical equipment and transformers, small engines and motorcycles to become more reliable, thus reducing maintenance needs. Further, because many of these items are becoming more affordable, it is becoming more common to replace broken machinery and other equipment rather than to repair these items.

This occupational group includes a wide variety of mechanics who are employed across many different industries. Consequently employment prospects for these occupations vary considerably.

Workers in the other small engine and equipment mechanics field account for about 33% of this occupational group. Employment of these workers is projected to grow more slowly than the average for all occupations. A total of 290 positions are projected to become available for these workers over the projection period. A growing demand for recreational equipment and pleasure craft, such as motor boats, will be a source of some employment growth for these workers.

About 32% of all workers in this group are electric appliance servicers. Employment of these workers is projected to decline. The 160 openings that are projected to become available will be to replace workers who retire.

Employment of electrical mechanics is projected to grow faster than the average for all occupations and faster than any other occupation within this group. Although only 29% of all workers in this group are electrical mechanics, 45% of the openings projected for this entire occupational group (450 in total) are for positions in this field.

Very few workers in this group are oil and solid fuel heating mechanics. A total of only 70 employment openings are projected for these workers. Red Seal certification allows journeypersons in this field to work in all provinces and territories.

Motorcycle and other related mechanics make up the smallest proportion of this group. Employment of these workers is projected to decline. A total of only 30 net employment openings will result from the need to replace workers who retire from 1998 to 2008.

Because consumer and industrial products are changing so quickly, the best prospects will be for those workers with up-to-date skills who are comfortable with electronic components and skilled in a variety of areas. It is possible to move up to specialist and management positions with experience. Experienced and qualified mechanics in these fields can also open and operate their own repair shops. For those interested in this option, experience and additional training in business management are useful.

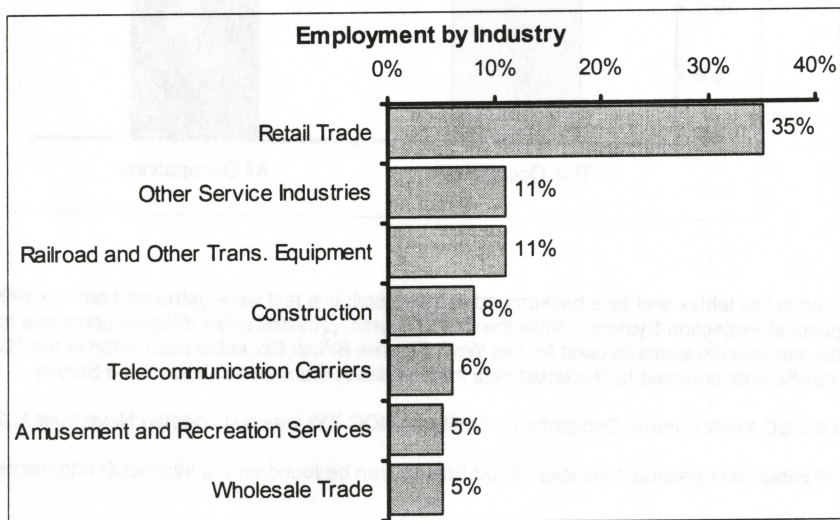
B.C. Employment Trends and Projected Demand

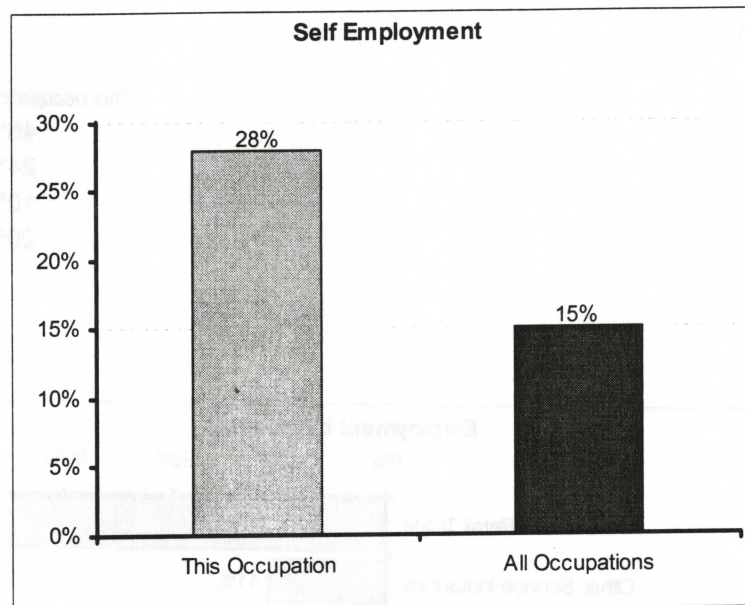
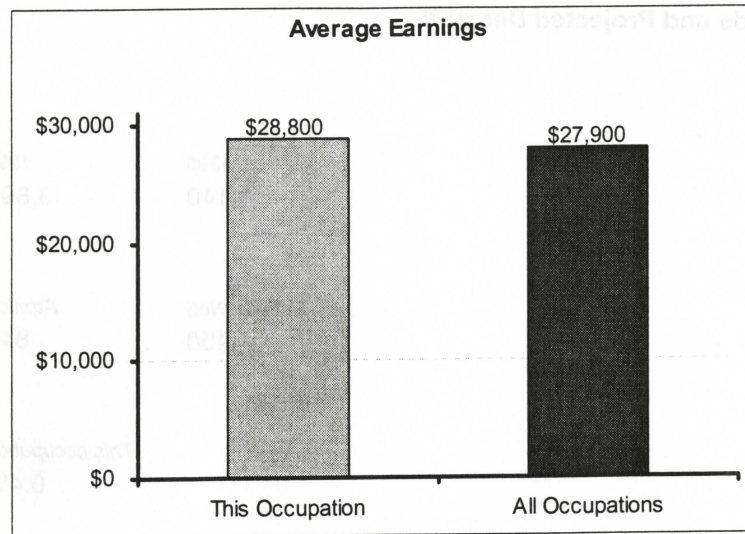
*Data Definitions

Number Employed	1990 4,140	1998 3,890	2008 4,040
Estimated Openings 1998-2008	Growth (Net) 150	Attrition 840	Total 990
Annual Growth 1998-2008		This occupation 0.4%	All occupations 1.6%

Employment by Region

	This occupation	All occupations
Lower Mainland	46%	57%
Vancouver Island	24%	18%
Northern B.C.	10%	10%
Okanagan/Kootenay	20%	15%



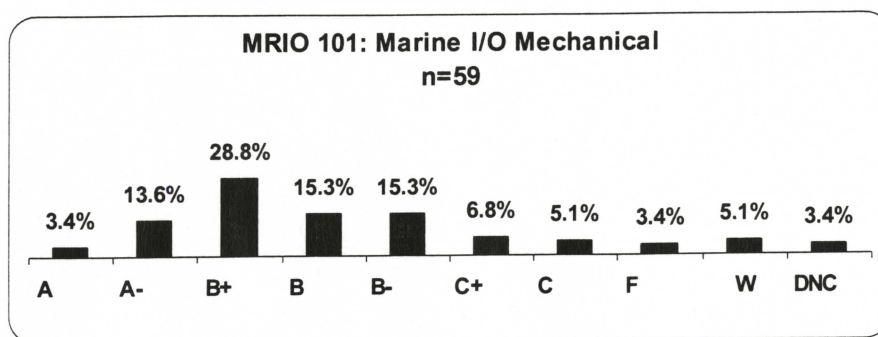


* STATISTICAL DATA used in the tables and as a background to the descriptive text were gathered from the 1996 Census of Canada, and from COPS (Canadian Occupational Projection System). While the COPS system provides a few different scenarios to test different economic conditions across Canada, the specific scenario used for this Work Futures-British Columbia publication is the "1999 B.C. Unique Reference Scenario", with variable coefficients enriched by the latest data from Statistics Canada's Labour Force Survey.

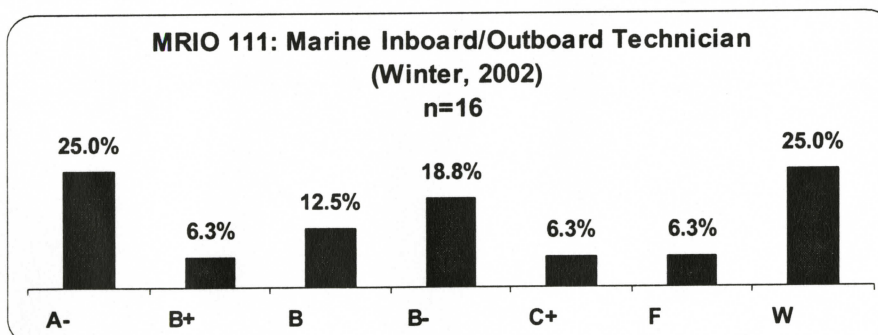
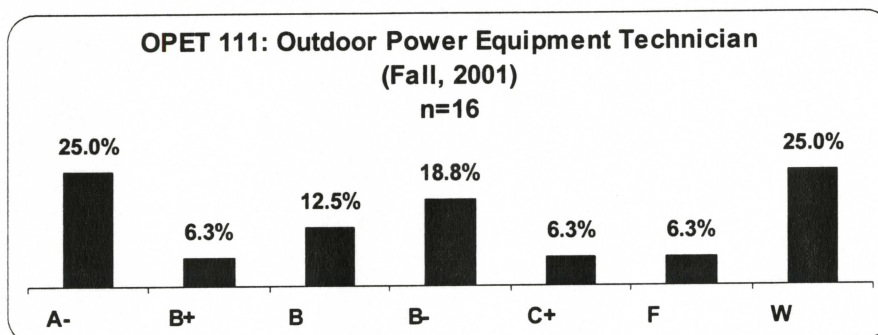
Information presented in the BC Work Futures Occupational Profile for NOC 733 was last updated November 1, 2000.

"Work Futures: British Columbia Occupational Outlooks , 2000 Edition" can be found on the Internet at <http://workfutures.bc.ca>

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